

Mass Surveys and Selective Case-Finding

Two Tools for Tuberculosis Control

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THE PERIOD of diminishing returns of traditional case-finding methods is here. New methods of selective case-finding are needed to discover unknown cases of tuberculosis and eventually to eliminate the disease as a public health problem. One such method of selective case finding, which was introduced in Tulare County in 1953, is presented herewith. It is thought that it may provide an additional valuable tool for the tuberculosis control program of local health jurisdictions.

Tulare County, with population of 145,000, covers an area of nearly 5,000 square miles. It is almost entirely rural; 70 per cent of the residents live in the nonincorporated parts of the county.

Distances are considerable. From the county seat, Visalia, it is 20 miles to Dinuba in the north, 32 miles to Earlimart in the south and 31 miles to Porterville in the east.

The Tulare County Health Department, in addition to its Visalia headquarters and primary center, maintains branch offices in Dinuba, Tulare and Porterville, and assigns nurses and sanitarians to work out of these offices. Prenatal clinics, child health conferences, immunization clinics and venereal disease clinics are conducted in these offices, bringing services of the health department within the reach of a majority of the county's population.

Tuberculosis Control Program Until 1952

Until 1952, the tuberculosis case-finding program was conducted with a mobile 70 mm. chest x-ray unit carrying out traditional mass surveys. A weekly chest clinic was operated at the Visalia office for the initial follow-up examination of persons with "suspicious" mass survey x-ray films and for investigations of persons in contact with those suspected of having tuberculosis. An outpatient clinic at the Tulare-Kings Counties Tuberculosis Hospital in Springville was the diagnostic facility and the case supervision center. Springville is located in the foothills of the Sierra Nevadas, 47 miles from Visalia, and it is not served by a public transportation facility.

The New Plan

In the fall of 1952, the Tulare County Health Department obtained the use of a second mobile 70

• *The productivity and effectiveness of the traditional mass x-ray survey method of tuberculosis case-finding were compared with those of a selective use of mobile miniature x-ray equipment. In Tulare County, California, two mobile miniature x-ray units were operated independently of each other. One unit conducted community-wide, pre-planned surveys, while the other unit operated a regular weekly schedule of mobile screening clinics in four cities in the county.*

The main features of the selective screening program were: (1) Extensive use of the physician referral method; (2) utilization of the unit for contact investigation; (3) interpretation of the minifilm and mailing of film and report to the family physician one day after the screening clinic.

Results: Mass survey found one case of tuberculosis per 2,200 minifilms taken; cost per case found, \$475. Selective screening program found one case per 292 minifilms taken; cost per case found, \$111. Of all cases of tuberculosis reported in 1953, 8 per cent were found by mass survey and 18 per cent by selective screening.

mm. chest x-ray unit, to be operated by the department until the Tulare County General Hospital would be ready to operate an admission x-ray service in its new clinic building. The temporary availability of two mobile x-ray units made it possible during 1953 to plan to conduct two parallel case-finding programs in order to attempt a comparison of the productive value of the mass x-ray survey with that of a selective case-finding program.

The following was the plan for the operation of the two programs: One unit (Unit I) was to be used to conduct mass surveys in communities throughout the county, surveys of high school and college students, of farm labor camp inmates, and of visitors to county and district fairs. This program was the continuation of one which had been developed over a period of five years and which had been well accepted by the community. The other unit (Unit II) was to be placed on a regular schedule

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TABLE 1.—Attendance at scheduled mobile x-ray clinics (Tulare County, 1953)

Month	Total Attendance	Physician Referrals		Self Referrals	Other Referrals (Schools, Public Health Nurse, etc.)
		No.	Per Cent		
January	297	22	7.4	231	44
February	315	37	11.7	206	72
March	676	94	13.9	365	217
April	691	95	13.7	382	214
May	434	54	12.4	174	206
June	451	79	17.5	272	100
July	503	102	23.0	310	91
August	435	81	18.6	321	33
September	586	113	19.3	453	20
October	521	87	16.7	430	4
November	514	102	19.8	400	12
December	702	105	14.4	457	140
Total.....	6,125	971	15.8	4,001	1,153

visiting four cities in the county—Visalia, Tulare, Dinuba, and Porterville—on four successive days each week.

The Mass Survey Program

Preparations for Unit I activities consisted of carrying out community health surveys by sanitarians and public health nurses to stimulate local interest in community health problems, recruiting community organizations to sponsor the program, giving talks to service clubs, and getting newspaper, radio and television publicity.

Interpretations of the 70 mm. films taken by Unit I were obtained by double reading of each miniature film by the staff of the Tulare-Kings Counties Tuberculosis Hospital. Reports were sent to the patients. Suspicious films were rechecked with 14x17 films in the weekly chest clinic in the health department in Visalia. The films were developed immediately, were reviewed by a chest specialist, and the patient was advised of the tentative impression. Further steps were then decided upon after consultation with the family physician.

The Scheduled Mobile Clinic Program

Before it was put into use, this plan was presented to the Public Health Committee of the Tulare County Medical Society and was approved by it. Later, the County Medical Society also approved of it upon recommendation by its Public Health Committee.

The schedule of weekly mobile x-ray clinics operated by Unit II, was publicized through the health department's regular news outlets and was made known especially to all physicians, public health nurses and school nurses. Referrals of patients by physicians, of persons with known exposure to tuberculosis, and of persons with symptoms of chest disease coming to the attention of nurses were particularly solicited. Self-referrals of persons over 15 years of age were accepted, but no effort was made to encourage them on a large scale.

Two films were taken of each patient. They were developed daily and were read the following day by

a qualified physician. A form letter of information with advice regarding follow-up, if indicated, was mailed to the patient on the same day; at the same time, one of the two films taken and the interpretation of it were sent to the family doctor. In the case of patients referred by physicians no letter was sent to the patient. The follow-up was carried out by the family physician or, if none was available to the patient, in the weekly chest clinic in Visalia.

Utilization of Unit II by Private Physicians

Acceptance by the medical profession of the selective case-finding program and of the new use of miniature chest x-ray equipment, was slow at first. However, there was a gradual increase in the number of patients referred to the mobile clinics, and the total volume of persons examined also grew (Table 1).

Comparative Statistical Evaluation (Table 2)

During the year, Unit I took 18,414 miniature chest x-ray films. Nine new cases of active tuberculosis were found among them, representing 8 per cent of all new cases found in Tulare County in 1953. The ratio was 2,200 x-ray films taken for each active case found.

Unit II took 6,125 miniature chest x-ray films, and 21 new cases of active pulmonary tuberculosis (18 per cent of all new cases found during the year) were discovered thereby. The ratio was 292 x-ray films for each active case found.

Effect on Tuberculosis Control Program in Tulare County

The introduction of this new method of case-finding in the county stimulated awareness of the need for early diagnosis of tuberculosis. A lowered threshold of suspicion among the county's physicians brought about a significant increase in the number of cases of tuberculosis reported in the minimal and moderately advanced stages, while the number of far advanced cases declined. Only 32.4 per cent of all cases of pulmonary tuberculosis were

TABLE 2.—Number of cases of tuberculosis reported; by stage of disease, method of case-finding, and percentage of cases (approximately) in each category (Tulare County, 1951-1953)

Stage of Disease	1951						1952					
	Method		Method		Total		Method		Method		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Minimal	5	26	15	14	20	16	2	29	20	25	22	25
Moderately advanced..	7	37	34	32	41	33	3	42	22	27	25	28
Far advanced.....	7	37	56	54	63	51	2	29	39	48	41	47
Total pulmonary tuberculosis.....	19	100	105	100	124	100	7	100	81	100	88	100
Other tuberculosis.....	....	....	11	....	11	....	....	....	11	....	11	....
Total tuberculosis.....	19	....	116	....	135	....	7	....	92	....	99	....

Stage of Disease	1953						1953					
	Unit I		Unit II		Total 70 mm.		Other		Total		Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Minimal	2	25	6	30	8	31	25	32	33	32	33	32
Moderately advanced.....	4	50	9	45	13	42	25	32	38	36	38	36
Far advanced.....	2	25	5	25	7	27	27	36	34	32	34	32
Total pulmonary tuberculosis.....	8	100	20	100	28	100	77	100	105	100	105	100
Other tuberculosis.....	1	....	1	....	2	....	9	....	11	....	11	....
Total tuberculosis.....	9	....	21	....	30	....	86	....	116	....	116	....

Total number films taken (1953) :	Total cases found (1953) :	Number of films taken per case found:
Unit I..... 18,414	Unit I..... 9	Unit I..... 2,200
Unit II..... 6,125	Unit II..... 21	Unit II..... 292
Total 24,539	Total 30	Total average 817

first reported in the far advanced stage, while in 1952, 47 per cent, and in 1951, 51 per cent had been in that category.

Cost of Program

The cost of the entire case-finding program, including the operation of the weekly follow-up clinic in Visalia, was approximately \$20,000.

The cost per case found was:

Mass survey program.....	\$1,111.00
Mobile clinic program.....	476.00
Both programs combined.....	666.00

COMMENT

It is believed that selective case-finding, as done by the mobile chest x-ray clinic method introduced in Tulare County in 1953, can contribute materially to the discovery of cases of tuberculosis in an early stage. The method was of value in obtaining better correlation between private physicians and the health department in the control of tuberculosis. An additional dividend in Tulare County was the good working relationship between the health department and the private medical profession, to the development of which this program contributed materially.

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